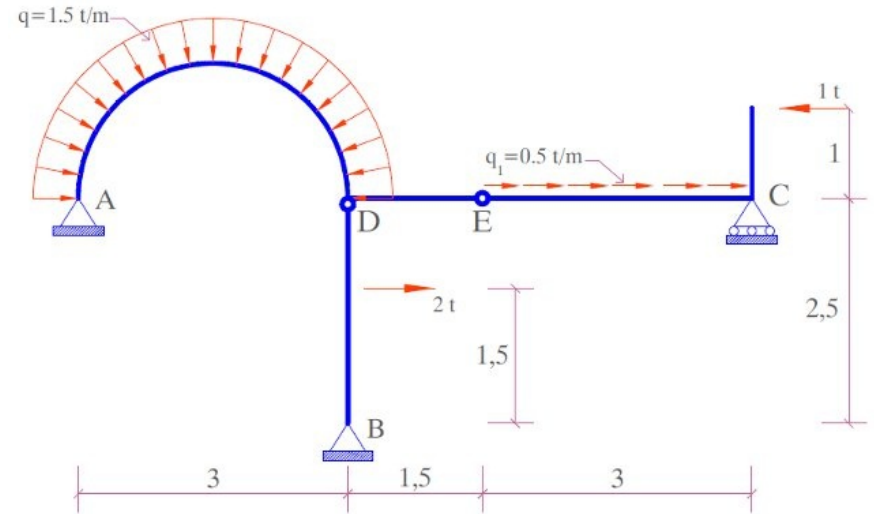
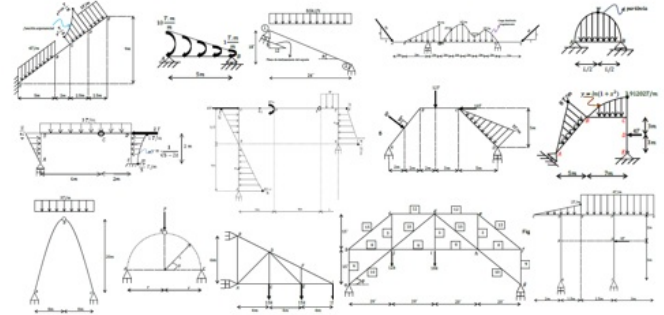


ESTRUCTURAS ISOSTATICAS

Un sistema mecánico o estructural es isostático cuando todas las fuerzas que actúan sobre cada uno de los elementos del sistema, pueden determinarse a partir de las ecuaciones de equilibrio de un sólido rígido.



Grado Estático

$$✓ GE = R - \textcircled{E} - e$$

$R \rightsquigarrow$ Número de Reacciones

$E \rightsquigarrow$ Número de ecuaciones

$e \rightsquigarrow$ Ecuaciones especiales

$GE = 0 \rightsquigarrow E$. Isostático

$GE > 0 \rightsquigarrow E$. Hiperestático

$GE < 0 \rightsquigarrow E$. Hipoestático

Ecuaciones de la Estática

Plano: 3 ecuaciones

$$\sum F_x = 0, \quad \sum F_y = 0$$

$$\sum M = 0$$

Espacio: 6 ecuaciones

$$\sum F_x = 0, \quad \sum F_y = 0, \quad \sum F_z = 0$$

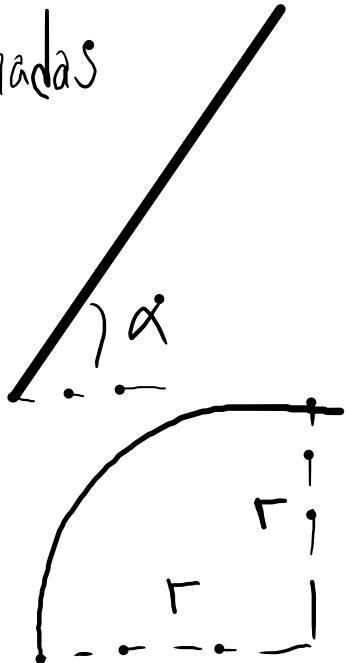
$$\sum M_x = 0, \quad \sum M_y = 0, \quad \sum M_z = 0$$

Elementos Estructurales

Viga



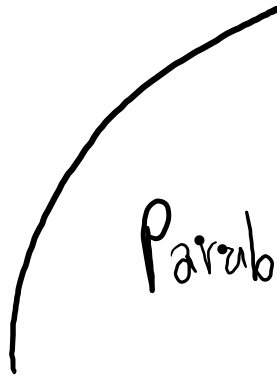
Inclinadas



Circulares

Columna

Parabólicas



Tipos de Apoyo

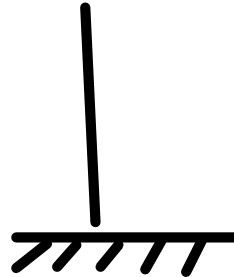
Apoyo fijo



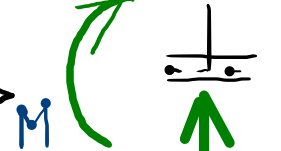
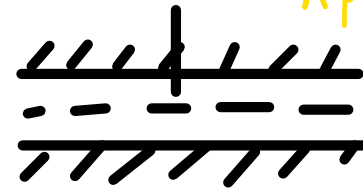
Apoyo Móvil



Empotrado



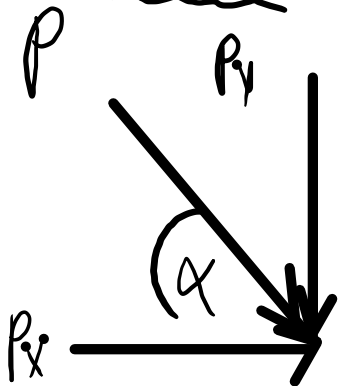
Apoyo Guía



Articulación el momento es 0



Tipos de Carga

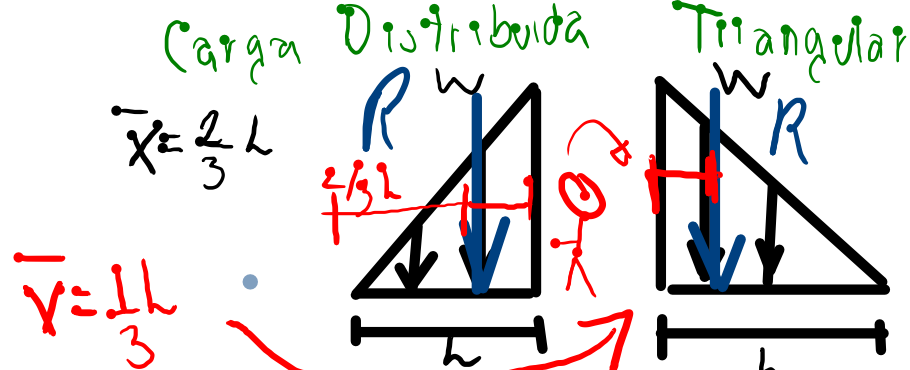
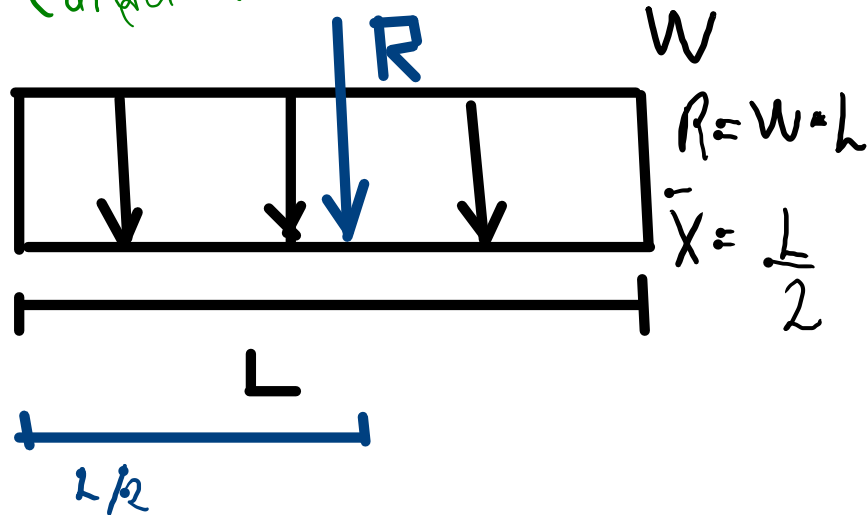


Puntual

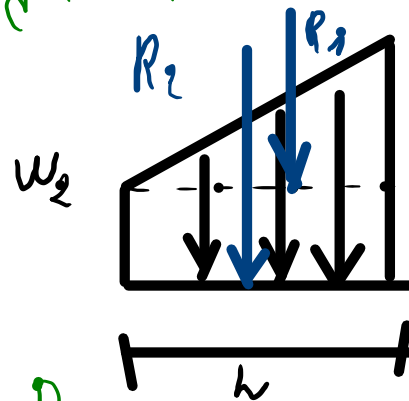
$$P_x = P \cos \alpha$$

$$P_y = P \sin \alpha$$

Carga Distribuida Uniforme



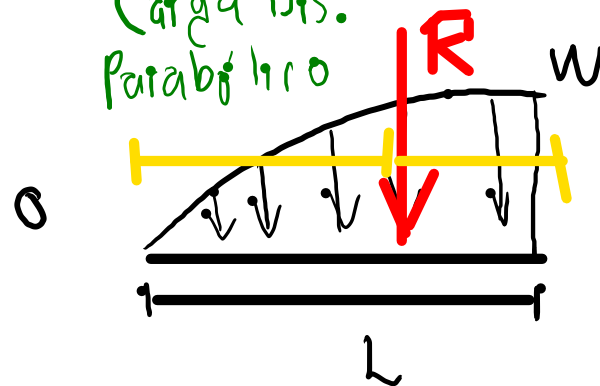
Carga distribuida Trapezoidal



$$R_1 = \frac{w_1 \cdot L}{2}; \bar{x}_1 = \frac{2}{3}L$$

$$R_2 = w_2 \cdot L; \bar{x}_2 = \frac{L}{2}$$

Carga Dis. Parabolica

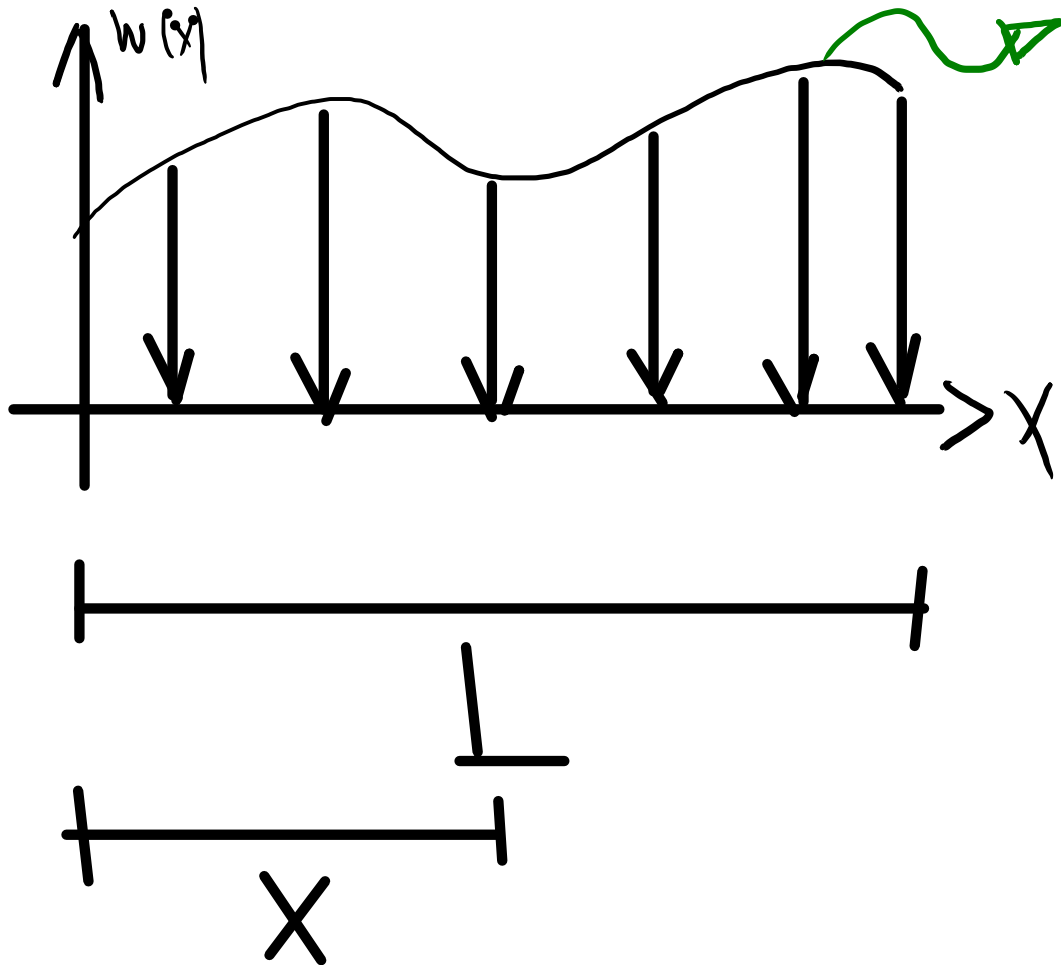


$$R = \frac{2}{3}L \cdot W$$

$$\bar{x} = \frac{2}{3}L$$

$$R = \frac{W \cdot L}{2}$$

Cargas Distribuidas. Variables



$$w(x) = y$$

$$R = \int_0^L w(x) dx$$

$$\bar{X} = \frac{\int_0^L x w(x) dx}{\int_0^L w(x) dx}$$

$$\bar{X} = \frac{\int_0^L x w(x) dx}{R}$$

Tipos de Estructuras

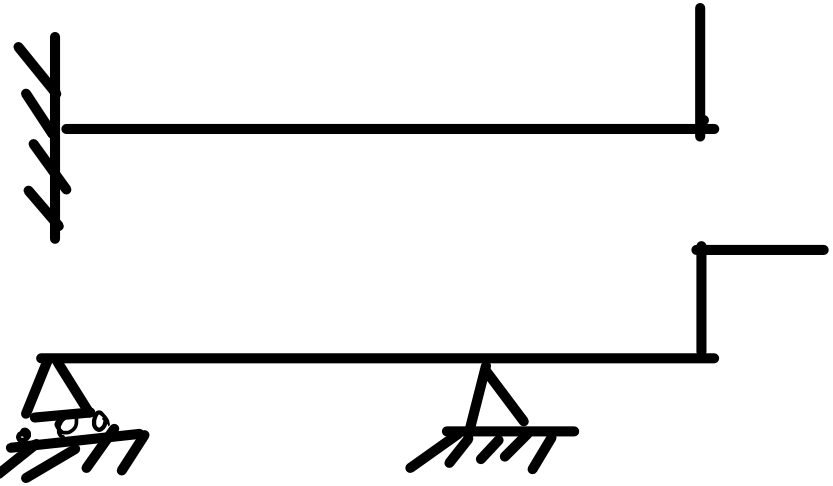
Viga simplemente Apoyada



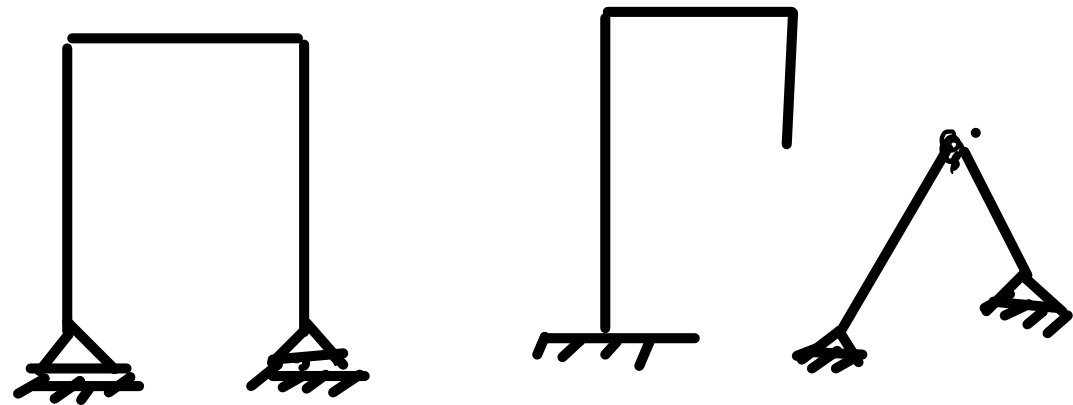
Vigas Gerbert



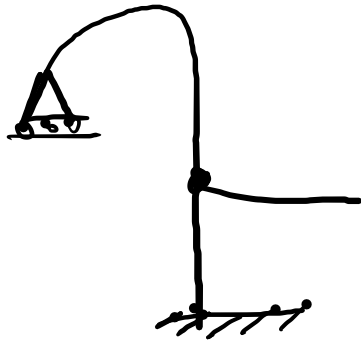
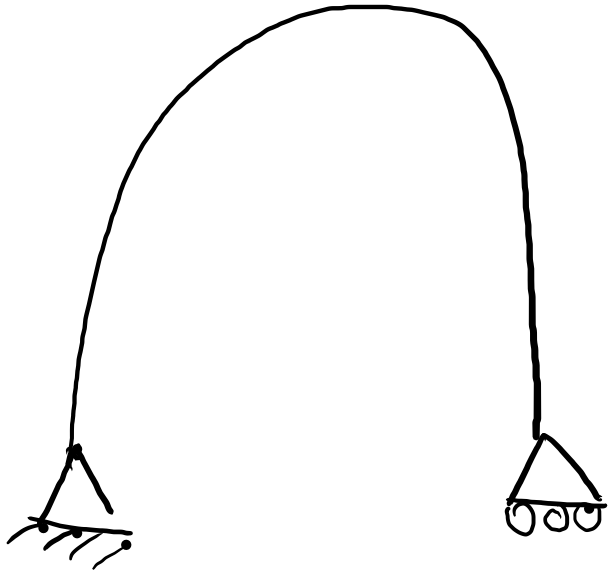
Menzulas



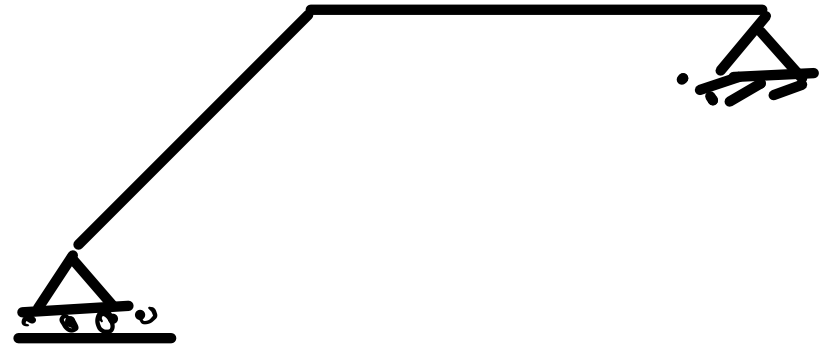
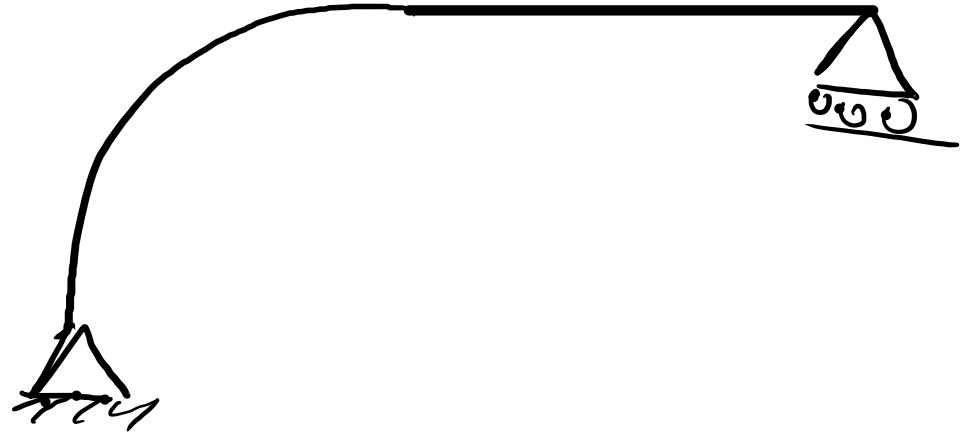
Porticos



Arcos



Mixtos



Ejemplos:

Determinar que tipo de estructura es:

②

$$G\bar{E} = R - \bar{E} - e$$

①

